

IMAGING VIGNETTE: CLINICAL VIGNETTE

Entrapped Crown of Orbital Atherectomy Device by Intimal Tissue Entanglement During Peripheral Intervention



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ABSTRACT

Orbital atherectomy is a commonly used procedure for peripheral arterial disease. Crown entrapment is a rare but potentially dangerous complication of orbital atherectomy. We describe a case of crown entrapment by markedly excessive atheromatous intimal tissue attachment to the device and an innovative retrieval technique that may minimize vascular injury. (**Level of Difficulty: Beginner.**) (J Am Coll Cardiol Case Rep 2021;3:412-4) © 2021 The Authors. Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

A 56-year-old woman with a history of diabetes mellitus and hyperlipidemia presented with bilateral calf claudication. Physical examination revealed the absence of palpable pulses and cool distal lower extremities.

A peripheral angiogram through right common femoral artery (CFA) access showed ostial occlusion of bilateral superficial femoral arteries (SFAs) (**Figure 1A, Video 1**). The 2.0-mm solid crown orbital atherectomy device was used to revascularize the left SFA through a contralateral approach. However, toward the end of the procedure, the crown became stuck, and attempts to pull the crown from the initial intervention site were unsuccessful despite angiographically successful reduction of the stenosis (**Figure 1B, Video 2**). At this point, the options were to refer the patient for an extensive surgical exploration to retrieve the device or to attempt a less invasive maneuver. Manual counterclockwise rotation of the drive shaft successfully dislodged the crown from the initial entrapped location; however, it could not enter the sheath (**Figure 1C**). Eventually, concomitant pulling of the sheath and device allowed movement across the iliac bifurcation to the right CFA, but the crown could not be removed from the arteriotomy site (**Figure 1D**). The sheath was then upgraded to a larger-French sheath size in efforts to retrieve the crown, although this was still unsuccessful given the bulkiness of the crown. The patient was subsequently transferred to the operating room, and successful surgical retrieval of the crown revealed moderate atherosclerotic intima adhered to it (**Figure 1E**). Post-retrieval surveillance of the inflow and distal arteries revealed optimal flow.

Crown entrapment is an extremely rare complication of orbital atherectomy. The largest orbital atherectomy dataset, involving 3,135 subjects and 4,766 peripheral artery lesions, reported a low complication rate of dissection, slow flow, distal embolism, and perforation, but no cases of crown entrapment (1). In our case, the crown was entangled by significant atherosclerotic intimal tissue resulting from a heavy atheroma burden and

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Manuscript received October 25, 2020; revised manuscript received December 3, 2020, accepted December 14, 2020.

friable intima of the SFA. By performing counterclockwise rotation with gentle traction, we successfully “unscrewed” the drive shaft of the device and minimized the need for extensive surgical intervention by limiting the arteriotomy exploration.

On follow-up days later, the femoral access site was healed without complication, and the patient’s claudication had improved.

In conclusion, orbital atherectomy during peripheral intervention may be complicated by crown entrapment resulting from entanglement by excessive friable intimal tissue. This is a rare complication, but one that must be considered by interventionalists performing the procedure. In this case, manual counterclockwise movement with gentle traction dislodged the entrapped crown. However, there is no clinically proven technique to manage this complication.

**ABBREVIATIONS
AND ACRONYMS**

CFA = common femoral artery

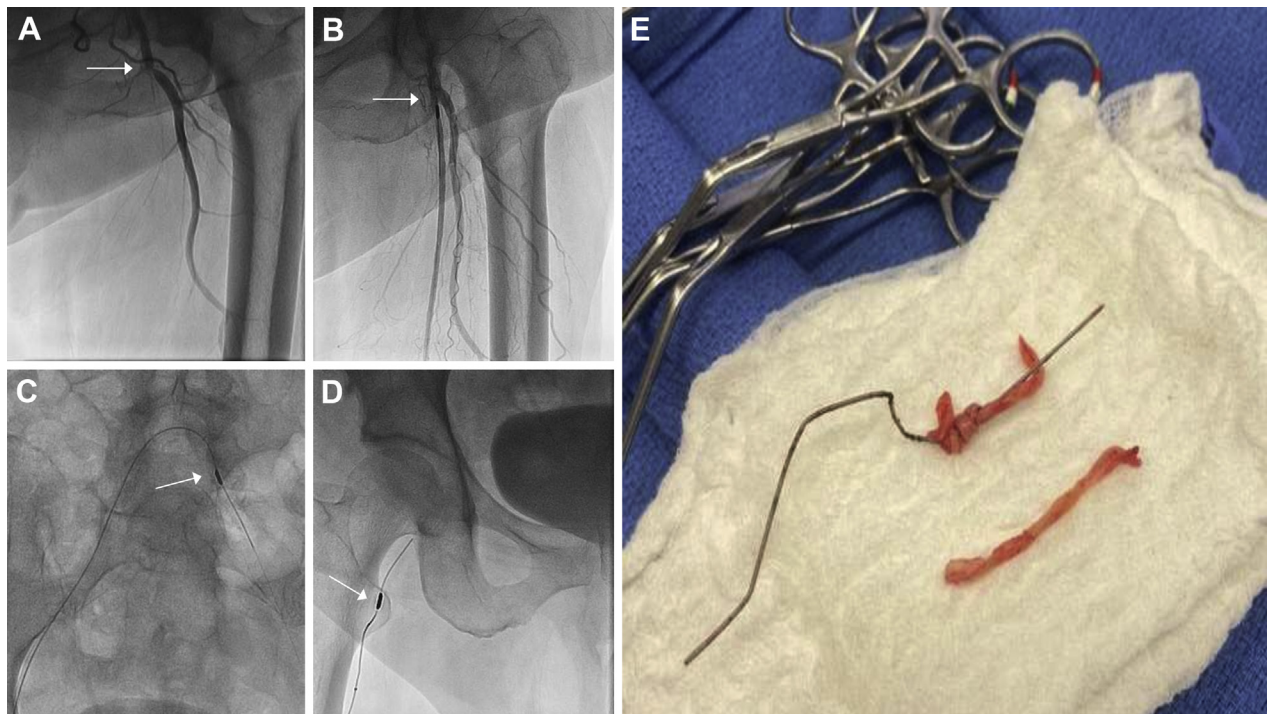
SFA = superficial femoral artery

FUNDING SUPPORT AND AUTHOR DISCLOSURES

The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

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FIGURE 1 Entrapped Crown




(A) Occluded ostium of the left superficial femoral artery (**arrow**). **(B)** Successful revascularization, but the crown (**arrow**) became stuck. **(C)** After a counterclockwise maneuver, the crown (**arrow**) was movable but failed to enter the sheath. **(D)** Final position of the crown (**arrow**). **(E)** Surgical retrieval of the crown with intima adherence.

REFERENCE

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KEY WORDS atherosclerosis, claudication, complication, peripheral circulation, peripheral vascular disease

 **APPENDIX** For supplemental videos, please see the online version of this paper.